Space Weather Forecast

Issued on Thursday, 28 September 2023 at 01:13 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Chance of Moderate flares (R1-R2 Radio blackouts) throughout. A very slight chance of G1 minor geomagnetic storms on Days 1-2 (27-28 Sep).

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Low. The largest flare was a Common-class flare at 27/0546UTC originating from a region just beyond the southeast limb. There remains an ongoing chance of Moderate flares, with a slight chance of a Strong flare.

There are currently eight sunspot regions on the visible disc, with five of these located in the western hemisphere. A moderately large region in the southwest quadrant has been the most active region in the past 24 hours. However, only small changes in evolution have been observed in recent imagery. Other larger regions have recently shown signs of simplifying. A new region becoming visible from over the southeastern limb was likely responsible for the Common-class flare mentioned above. Other regions are generally simple and unremarkable.

No potential Earth-directed coronal mass ejections (CME) have been observed in the past 24hrs.

Solar Wind / Geomagnetic Activity: Solar winds showed an initial decline from elevated to slightly elevated levels, but have since risen back to elevated. This increase may have been the result of a coronal hole high speed stream. The Interplanetary magnetic field (IMF) was weak throughout. The north-south component was very variable. Resultant geomagnetic activity started at Active (Kp4) levels, then became Quiet to Unsettled (Kp1-3) from 27/0300UTC.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) remained at background levels, with no Solar Radiation storms observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is forecast to be generally Low, but with a chance of Moderate flares, and a slight chance of isolated Strong flares, most likely from the larger sunspot regions in the western hemisphere.

Solar Wind / Geomagnetic Activity: A possible glance from weak CME arrivals cannot be ruled out on Days 1-2 (28-29 Sep), however this is deemed very low confidence.

Solar winds are expected to start at slightly elevated levels at first, most likely as a result of a waning influence of a high speed stream. Solar winds are expected to gradually drop back to more ambient levels, with perhaps a rise on Day 4 (1 Oct) in any connection to a new coronal hole high speed stream.

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Geomagnetic activity is expected to be largely Quiet to Unsettled (Kp 2-3), with a slight chance of Active or perhaps G1/Minor Storm (Kp 5) intervals on Days 1-2 (27-28 Sep) due to any possible further glancing CME effects, although this is very low confidence. Quiet to Unsettled (Kp 1-3) activity is expected to continue through much of the period, with perhaps some Active intervals late on Day 4 (1 Oct) due to a possible coronal hole high speed stream.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is forecast to remain generally at background levels, but with a slight chance of Solar Radiation storms.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	15	15	10	5
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	40	40	40	40
Very Active	R3 to R5 X	No	10	10	10	10

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	15	15	15	15
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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